

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) Ultrasonic image processing system, for processing images in an image sequence representing a segment of artery explored along its longitudinal axis, said artery segment showing moving walls; this system comprising:

semi-automatic detection means for detecting the artery walls in an image of the sequence;

automatic rigid tracking means for tracking ~~the~~ corresponding artery walls in other images of the sequence;

evaluation means for evaluating ~~the~~ artery wall motion and distensibility; and

viewing means for visualizing the images together with together with parameters that include the distensibility being a ratio of dilation by a diameter of the artery.

2. (Currently Amended) The system of Claim 1, wherein the semi-automatic detection means is a user assisted artery wall detection means comprising user interaction means for:

selecting a reference image as a starting image among the images of the sequence;

drawing lines, called paths, representing the artery walls in the starting image, assisted by a path search technique based on the minimization of a cost function.

3. (Currently Amended) The system of Claim 2, wherein the user interaction means for drawing a path representing a wall comprises means for:

selecting a starting pixel in the starting image for creating a new path structure;

drawing a portion of the path between the starting pixel and a second selected pixel in the starting image;

evaluating the cost function of the portion of the path as the a sum of the cost of the individual pixels that constitute the path;

selecting ~~the~~ an optimal path as the path that minimizes the cost function;

memorizing the optimal path;

drawing portions of path between successive pixels; and

performing the operations of evaluating ~~the~~ respective cost functions, selecting ~~the~~ optimal paths and memorizing the optimal paths until a complete path is drawn for the artery wall.

4. (Currently Amended) The system of Claim 3, having means for estimating the cost of the individual pixels based on ~~the~~ a gradient at ~~the~~ a pixel in the ~~ultrasonic~~ image.

5. (Currently Amended) The system of one of claim 3, wherein the automatic rigid tracking means for tracking the corresponding artery walls in other images of the sequence comprises means of path finding including means for:

defining regions of interest (ROIP, ROID) around the paths drawn in the starting image and using the same regions of interest in the other images of the sequence;

selecting a current image next to the starting image;

initializing the tracking of the paths in the current image by  
using ~~the~~ positions of the paths in the starting image;

applying translations to ~~said~~ initial paths in the current  
image to fit the walls in the current image;

evaluating the cost of the paths in the current image using  
the same cost function as in the starting image and finding the  
translations that minimizes the cost function;

iterating ~~these path finding steps until the~~ a beginning and  
~~the~~ an end of the sequence are reached.

6. (Currently Amended) The system of Claim 5, wherein means  
for evaluating the cost performs cost evaluation of the individual  
pixels based on ~~the~~ a gradient at the pixel in the ultrasonic  
images calculated for all the images of the sequence, considered as  
a two-dimensional-~~plus time volume~~ images corresponding to a volume  
over a period of time.

7. (Currently Amended) The system of claim 1, further  
comprising computation means for calculating ~~the~~ dilation of the  
artery along ~~the~~ ultrasound beams in the images of the sequence

using ~~the~~ segmentation of the walls performed by path finding with semi-automatic detection and rigid tracking.

Claim 8 (Canceled)

9. (Currently Amended) ~~A~~ The system as claimed in claim 1, ~~having further comprising~~ color display means to display colored paths for the artery walls and colored patterns for ~~the wall~~ dilation dilation of the artery walls, superimposed on the ultrasonic images.

10. (Currently Amended) ~~A~~ The system as claimed in claim 1, further comprising a suitably programmed computer of a workstation or a special purpose processor having circuit means, which are arranged to process ~~ultrasonic the~~ images, having means to display the processed images, and having a user interface ~~such as a mouse or a keyboard~~ to permit ~~the~~ a user of interacting on the respective images of the sequence in order to display ~~the~~ quantified parameters related to the artery walls.

11. (Currently Amended) A computer readable storage medium comprising a computer program product comprising a set of instructions to be used in a system as claimed in claim 1.

12. (Currently Amended) A The system as claimed in claim 1, ~~wherein the transducer array is further comprising a curved~~ transducer array.

13. (Currently Amended) An ultrasonic medical image processing method comprising ~~steps of acts of:~~

acquiring a sequence of ultrasound images, using an array of transducer elements, ~~and steps for~~

detecting anomalies in arteries ~~comprising,~~ wherein the detecting act comprises the acts of:

semi-automatic ~~detection of~~ detecting the artery walls in a reference image of the sequence;

automatic rigid tracking of the corresponding artery walls in other images of the sequence;

~~evaluation of~~ evaluating the artery wall motion and distensibility; and

visualization of visualizing the ultrasound images together  
with together with parameters that include the distensibility being  
a ratio of dilation by a diameter of the artery.

14. (Currently Amended) An ultrasound examination apparatus  
having means to ~~acquired~~ acquire ultrasound images and coupled to  
an image processing system according to claim 1.

15. (New) An image processing system for processing images in  
a sequence representing a segment of artery explored along its  
longitudinal axis, said segment showing moving walls; the system  
comprising a processor configured to:

track artery walls detected in an image of the sequence in  
other images of the sequence;

evaluate artery wall motion and distensibility for display of  
the images together with parameters that include the distensibility  
being a ratio of dilation by a diameter of the artery.

16. (New) The image processing system of claim 15, wherein the  
artery walls are detected through user interaction.

17. (New) The image processing system of claim 15, wherein the artery walls are detected through user interaction combined with live-wire detection including:

selecting a reference image as a starting image among the images of the sequence; and

drawing paths representing the artery walls in the starting image, assisted by a path search technique based on the minimization of a cost function.